TEXAS AGRICULTURAL EXPERIMENT STATION.

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SWEET POTATOES.

Agricultural and Mechanical College of Texas.

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TEXAS AGRICULTURAL EXPERIMENT STATION.

THE SWEET POTATO.

(*Ipomea Batatas Lam. Convolvulus Batatas Linn.*)

R. H. PRICE, B. S.

The Sweet Potato is one of our most important vegetables. It may be cultivated in the garden for family use, or, on account of its qualities for stock feed, it may be grown profitably as a field crop. It thrives and matures in the driest and hottest weather. Owing to its general adaptability to different soils and climate, its easiness of propagation and cultivation, it is grown, at least to some extent, at nearly every rural home of the South. It and "the lonely peach sprout" are all that are seen growing in many southern gardens.

The varieties are often so mixed when sent to market that the inferior ones make the selling price for the whole, consequently the real cash value of the best sweet potatoes is often not realized.

ITS IMPORTANCE TO THE STATE.

From the fifth annual report of the Agricultural Bureau of Texas, by Hon. Jno. E. Hollingsworth, commissioner, we quote the following statistics on three of the leading crops grown in the state to show the comparative value of the sweet potato:

COTTON.

Total number of acres	4,520,310.
Total number of bales	2,026,473.
Total value	$69,439,476.

CORN.

Total number of acres	3,166,353.
Total number of bushels	63,135,004.
Total value	$28,429,125.

WHEAT.

Total number of acres	442,337.
Total number of bushels	6,978,385.
Total value	$ 5,244,303.

SWEET POTATOES.

Total number of acres	29,928.
Total unmber of bushels	3,002,883.
Total value	$ 1,503,764.

According to the above statistics the value of each per acre is as given below:

Cotton, value per acre	$15.36.
Corn, value per acre	8.94.
Wheat, value per acre	11.88.
Sweet Potatoes, value per acre	**50.24.**

When it is considered that the difference in the cost of growing an acre of each is comparatively small, the fact is readily apparent that this vegetable deserves a higher place in Southern agriculture.

ORIGIN.

The native habitat of the Sweet Potato is not definitely known. It is generally supposed to be of American origin, but we have no authentic account of where and when it was first brought into cultivation by civilized man.

BOTANICAL.

The Sweet Potato is quite a different thing, botanically considered, from the Irish potato. The former is an enlarged root, while the latter is an enlarged subterranean stem. The Sweet Potato belongs to the morning glory family (convolvulaceae), and the Irish potato belongs to the night shade family (solanaceae).

VALUE OF THE TOPS.

Farmers usually allow the tops to decay on the ground. They make an important feed for stock and especially for dairy cattle. This is true in particular of the tops of the Vineless, which remain green during very severe drouths when grass usually is scorched and killed by a burning sun and dry winds. Since they grow in bunches and stand up well they can be cut with a mowing machine and put up like regular forage crops. They have also been recommended by a farmer in this state for salad. We have tried them and find them to make a salad of very fair quality. Their contents of protein, ash and crude fiber rank about as high as they do in the tuber. This is shown in the analysis of the tops by Prof. D. Adriance, given in table below. The analysis was made last October 10th. Since they are high in the content of water and carbo-hydrates, they should be mixed with a more dry and nitrogenous material for feed, such as cotton seed or cotton seed meal.

Water	84.720
Ash Content	2.735
Protein	2.420
Crude Fibre	2.320
N. fr. Ext	7.215

CHARACTER OF THE SEASON.

The past season was an unusually dry one. This accounts in a great measure, no doubt, for the small yields of many of the varieties. Prof. D. Adriance, meteorologist for the station, has kindly furnished the following data in regard to the amount of rainfall since last March till November: April, 1.41 in; May, 9.10 in; June, 3.50 in; July, 0.45 in; August, 1,85 in; September, 1.75 in; October, 0.17 in. It will thus be seen that in July when potatoes usually make considerable growth in the development of tubers not one-half inch rain fell during that hot month. One good thing has resulted, in that the season has brought out the DROUTH RESISTING QUALITIES of the varieties under test.

TEST OF VARIETIES.

During the past season thirty-one varieties have been tested here.

They were planted out in the experimental plots from the 15th to the 25th of April. They were planted in ridges five inches high, two feet wide and four feet apart; the plants standing one foot asunder in the row. Shallow cultivation was given till the plants covered the ground. The soil is a dark, sandy, compact clay of medium fertility under-layed by an almost impervious white clay. It is not the best for Sweet Potatoes, but it represents a large part of the soil in this section of the state.

The test for table quality was made when the potatoes were dug. No doubt some would show a higher table quality if they had been stored awhile.

It is a well known fact among many shippers of the vegetable that the soft sugary yams so highly appreciated in the South do not meet with ready sale in the Northern markets, consequently Sweet Potatoes shipped to the latter market should be rather dry and mealy like the Nansemond. Since "tastes differ" there can be no well defined standard of table quality but we think the grades given are a fair average of the table quality when dug. The table includes also relative TIME OF RIPENING notes on CHARACTER OE TUBERS when baked and YIELDS PER ACRE.

Name of Variety.	Season.	Character of Flesh when Cooked.	Yield per Acre in Bushels.			Table Quality—0 to 10.
			Merchantable.	Culls.	Total.	
Barbadoes	Late	Bluish white, soft and strong	17 26	10 89	28 15	4
Big Stem Jersey	Medium	Pale white, dry and hard	51 90	43 37	95 27	3
Black Spanish	Late	White, dry, hard; a little sour	55 89	7 68	33 57	3
Bunch Yam	Early	Light yellow, soft and mealy	133 32	22 70	156 02	8 5
Delaware	Medium	Light yellow, soft and wet	37 00	30 00	67 00	4
Dog River	Late	Yellow, soft and wet	11 24	8 65	19 89	3 5
Early Bunch Yam	Early	Light yellow, soft and mealy	144 00	37 51	181 51	8 5
Early Golden	Late	Yellow, soft and dry	79 90	18 16	98 06	5
Extra Early Caroline	Early	Yellowish, dry and choky	31 10	16 97	48 09	5
Georgia Yam	Late	Yellowish, white, dry	14 53	8 47	23 00	8
Gold Skin	Medium	Light yellow, soft and wet	21 79	18 87	40 66	4
Hayman	Late	Pale yellow, dry and mealy	31 50	9 00	40 50	8
Nansemond	Medium	Yellow, damp and soft	122 76	42 37	165 13	8 5
Negro Choker	Medium	Creamy yellow, mealy	107 21	15 98	123 19	5
New Jersey	Early	Light yellow, mealy and soft	42 37	7 56	49 93	6
Norton	Late	Dull white, soft and strong	46 94	7 51	24 45	4
Peabody	Late	Creamy yellow, dry and hard	82 50	16 26	105 46	5
Pumpkin Yam	Late	Red, soft and sweet	46 09	29 33	75 42	8 5
Red Bermuda	Late	Light yellow, dry	101 00	24 18	125 18	4 5
Red Brazilian	Medium	White, dry and sweet	95 45	24 18	119 63	7 5
Red Nansemond	Late	Pale yellow, sweet	43 71	8 17	51 88	6 5
Red Nose	Medium	Light yellow, a little strong	108 74	21 36	130 10	5 5
Shanghai (California)	Late	White, rather dry	164 23	35 53	199 76	7 5
Southern Queen	Medium	Milky white, dry and mealy	69 86	15 88	85 58	7
Spanish Yam	Late	Light yellow, a little soft and strong	11 24	9 12	20 36	3 5
Sugar (Creole)	Late	Whitish, soft and mealy	20 69	1 50	22 19	8 5
Tennessee	Medium	Light yellow, dry and mealy	40 76	28 81	69 57	8 5
Vineless	Early	Light yellow, soft and mealy	156 45	30 87	187 32	8 5
Yellow Jersey	Medium	Yellowish white, stringy and watery	23 53	21 71	45 24	3
Yellow Nansemond	Medium	Yellow soft and damp	41 26	30 60	71 86	5
Yellow Yam	Medium	Pale whitish, sweet and stringy	57 27	7 96	65 23	3 5

The following chemical analyses were also made by Prof. D. Adriance. The potatoes were taken to the labratory for analysis just after digging and therefore show their contents when taken from the ground. The analyses show that the varieties varied considerably in their contents. This may be partly due to the effects of the drouth which affected the foliage of some varieties considerably but in the main the analyses show the inherent qualities of the variety:

	Pumpkin	Norton	Shanghai	Delaware	Peabody	Big Stem Jersey	Early Golden	Yellow Jersey	Black Spanish	Red Bermuda	Extra Early Carolina	Yellow Yam	Southern Queen	Tennessee	Negro Choker	Brazilian	Vineless	Red Nose	Nansemond	Early Bunch Yam	Bunch Yam
Water	69 19	66 69	75 44	78 26	79 04	69 34	74 70	64 62	65 39	75 81	67 88	58 85	61 58	65 83	68 23	67 23	75 32	77 59	71 81	73 23	68 85
Ash	1 58	1 58	1 44	0 757	1 13	0 95	1 22	1 14	1 10	1 23	1 06	1 23	1 14	0 855	1 352	1 134	1 101	0 932	0 938	1 037	1 016
Ether Extract	1 09	0 91	0 69	0 64	0 55	0 736	1 655	1 30	1 41	1 035	0 88	1 25	0 71	1 12	1 23	0 997	0 943	0 834	1 022	0 836	0 981
Crude fiber	1 55	1 56	1 05	1 21	1 69	1 80	1 44	1 58	1 78	0 92	1 00	1 69	1 13	0 80	0 805	0 705	0 758	1 11	1 35	1 20	1 37
Protein	2 62	2 13	2 56	2 07	2 21	2 97	2 175	4 37	2 99	2 39	3 68	3 56	21 018	0 992	1 71	1 63	2 718	0 85	2 175	2 868	2 91
Nitrogen Free Extract	23 97	27 13	18 82	17 063	15 38	25 204	19 10	26 99	27 33	18 115	25 50	33 42	34 422	30 403	26 673	28 314	19 16	17 784	22 725	20 802	24 873
Invert Sugar	3 76	4 67	2 92	2 08	3 35	3 31	3 00	4 50	4 20	2 777	2 32	5 74	5 10	2 19	2 84	2 52	5 20	3 27	3 33	2 66	2 14
Total Sugar by Fehling	8 07	11 90	6 98	5 00	6 41	6 25	6 75	8 62	6 85	5 26	6 09	11 62	10 50	2 77	7 69	5 26	10 15	5 20	5 00	4 60	3 74

THE VINELESS. (Bunch Yam, Early Bunch Yam.) The above picture which was taken the 20th of last July shows the growth of the above so called varieties, growing in the rows at that date, while runners of other varieties had completely covered the ground. The first to the right is the Bunch Yam, second Early Bunch Yam, third Vineless, and the fourth Nansemond,

Bunch Yam, Early Bunch Yam and Vineless are one and the same variety. The botanical characteristics are the same. We have the seed from three different sources and have traced all back to one common origin.

We prefer to use the name "Vineless" because it is shorter and hope the seedsmen of the State will so catalogue it that growers may not be deceived. We paid thirty cents per pound for some "seed," and owing to the popularity of this variety the seed may continue to sell high for some time.

ORIGIN OF THE VINELESS.

This excellent yam which is being sold over the state under several different names we have traced to its origin. It undoubtedly originated in Mississippi in 1884. The following in regard to its origin was received from J. A. Burkitt & Sons, Abbott, Miss., Oct. 9th, 1893:

* * * "Yours of the 29th of September at hand, in reply will state that the Southern Bunch Yam originated on Mr. George Harvey's plantation near Columbus, Miss." Also the following from Mr. C. C. L. Dill, Dillburgh, Ala., was received Oct. 2nd, 1893: * * * "The Vineless is no doubt the same as the Bunch and I am *positive* that the Bunch Yam is a sport of the old fashioned Yam, since Harvey found it growing with that variety in 1884, and all the seed people have obtained, no doubt, can be traced to the same source, no matter what name may be given them. I have written up the Bunch for most of the leading agricultural papers and no one has successfully disputed its origin. Mr. Harvey lived just over the line in Mississippi and it is only a few miles from here. I am personally acquainted with his family and his immediate neighbors and all agree as to its origin, except that it is much larger."

The Vineless has the same characters of leaf as the Yellow Yam and also resembles it in character of tubers, but it stands the drouth better and has a higher table quality.

The Vineless is beyond question a great acquisition in sweet potatoes. It has a short stubby vine which seldom grows over two and a half feet long. It can be planted closer in the rows, cultivated and dug easier than the running varieties. The tubers grow in a bunch near the surface. It stood the drouth better here last season than the other thirty varieties and ranked second in yield. The table quality ranked equal to the best when dug. It produces slips abundantly. The tubers are smooth and rather above the medium size.

In regard to yield at other places, Mr. W. Kirkpatrick, McKinney, Texas, writes that "the Bunch Yam with me is nearly all vine with few potatoes" Mr. E. V. Dunn, Grapevine, Texas, Nov. 6th 1893 wrote "I gathered 200 bushels of the Bunch Yams from an acre. Half the acre

was set from the 25th to the 28th of July. The weather was very dry at the time of planting and we only had one light rain afterwards. I used cuttings on the last half. A few cuttings were put out on the 20th of June and they made at the rate of 350 bushel per acre. * * * It is by far the best sweet potato I ever tried and I think I have tested about every variety which had any merit—as to quality, I think it is perfection." * * *

CLASSIFICATION OF VARIETIES.

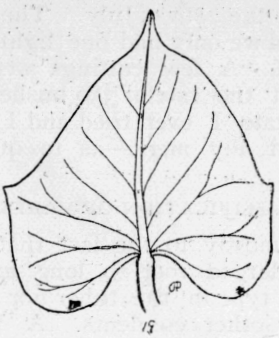
It is perhaps owing mostly to the fact that sweet potatoes have been propagated from an enlarged root so long and not from the seed that there is no well defined type in the tuber nor in the leaf like there is in the varieties of many other esculents. A Yam is supposed to be an oblong tuber, while the Sweet Potato proper is more nearly round, like the Irish Potato, but we often find both types in the same variety. The foliage of the Yam is generally lobed, while that of the Potato is more nearly entire. Still, there are exceptions to this principle. It seems very important that some standard for comparison should be had in order that much confusion may not exist in the markets nor among growers. Therefore in order that a better nomenclature may exist and growers be able to identify their varieties we have decided to divide them into three groups, based upon the character of the foliage, which perhaps is the most rational basis, since the foliage comes next to the flower and fruit which we seldom see in the Sweet Potato.

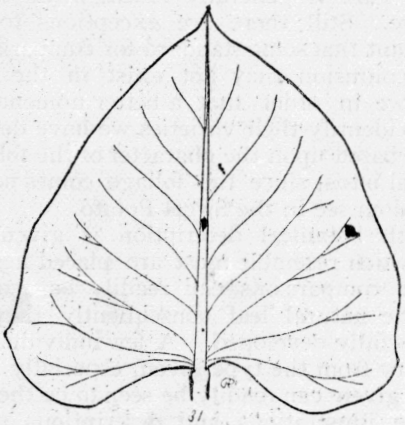
A short note with botanical description is given for each figure and variety. Those which resemble most are placed nearest together on the same page so that comparisons can readily be made. The drawings were made from the natural leaf consequently they represent the type when the foliage is fully developed. A few individual leaves even on the same vine may vary from the type given, especially when young, but in all cases the type given can readily be seen to be the prevailing one, and we think with the illustrations and descriptions no observing farmer would fail to identify varieties. The ANGLE AT THE BASE OF THE LEAF and the VEINS ALONG THE MARGIN OF THE BASE vary perhaps least of any other botanical characters of the foliage. The cuts are reduced one-half in size.

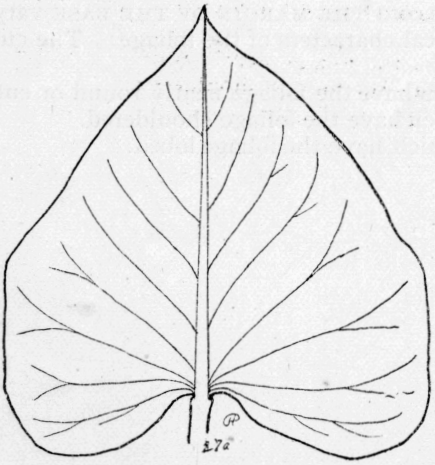
I. Those which have the foliage nearly round or entire.

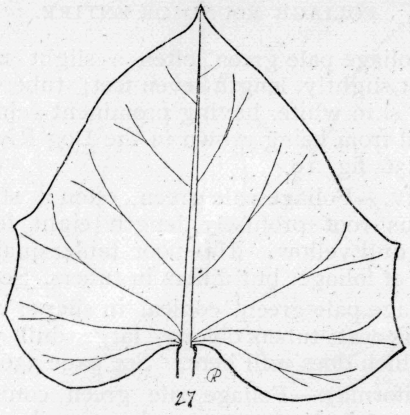
II. Those which have the foliage shouldered.

III. Those which have the foliage lobed.









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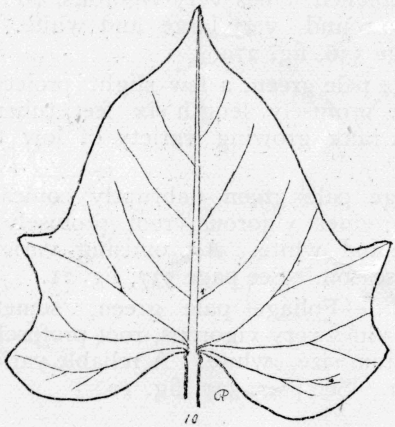

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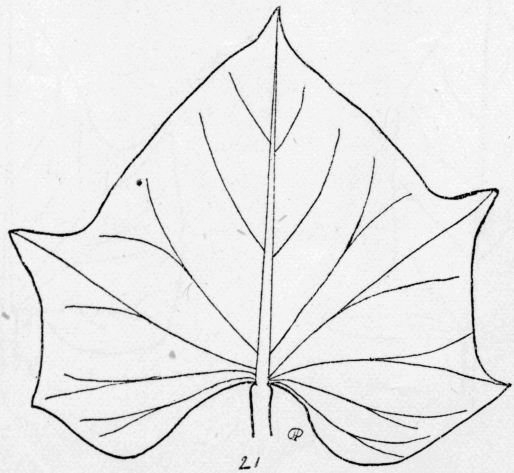

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FOLIAGE ROUND OR ENTIRE.

DOG RIVER.—Foliage pale green, often a slight notch on the sides; vines vigorous, root slightly, length seven feet; tubers roundish to oblong, medium size, skin white, having prominent veins. Has low table quality. So named from being grown in the Dog River section of Alabama. See page 336, fig. 19.

BIG STEM JERSEY.—Foliage pale green, often a slight notch on the sides; vines vigorous, root profusely, length eight feet; tubers oblong, medium size, skin dull yellow. Has poor table quality. Same as Dog River in character of foliage, but differs in tubers. See page 336, fig. 19.

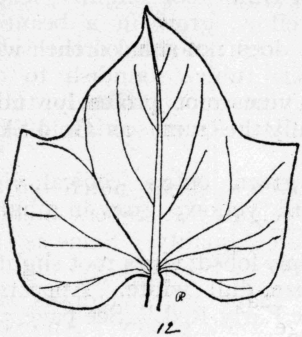
PUMPKIN.—Foliage pale green, conical in shape; vines vigorous, root profusely, length six feet; tubers oblong, large, dull yellow. An excellent sugary yam which does well here. See page 336, fig 31.

SHANGHAI (California).—Foliage pale green, conical in shape; sides sometimes slightly notched; vines very vigorous, do not root; length five feet, tubers oblong to round, very large and white. Made the largest yield here. See page 336, fig. 27a.

NORTON.—Foliage pale green; a few slight projections on the sides; vines vigorous, root profusely, length six feet; tubers roundish, rather large and white. A rank growing variety of low table quality. See page 337, fig. 27.

HAYMAN.—Foliage pale green, abruptly conical with prominent notches on the sides; vines vigorous, root profusely, length seven feet; tubers oblong, large and white. A promising variety but was affected by drouth here last season. See page 337, fig. 21.

SOUTHERN QUEEN.—Foliage pale green, sometimes prominently notched on the side; vines very vigorous, root profusely, length eight feet; tubers obtuse, medium size, white. A reliable variety which is much grown in the South. See page 337, fig. 10.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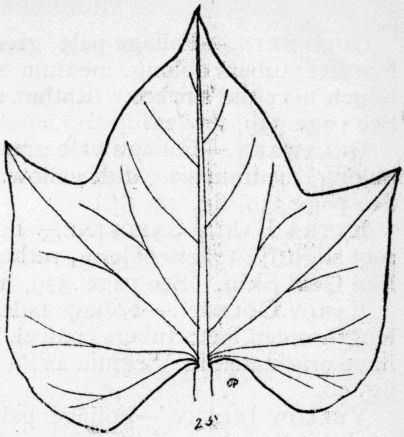
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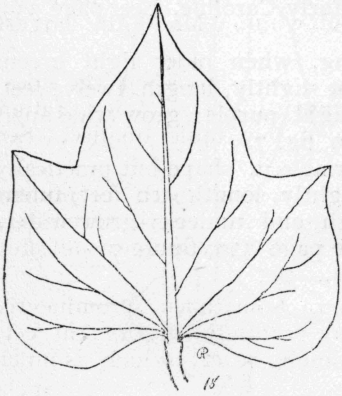
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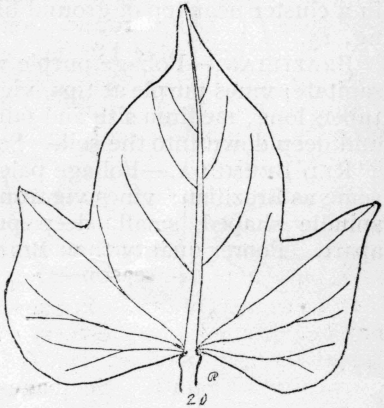
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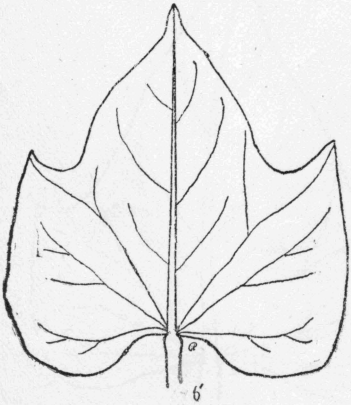
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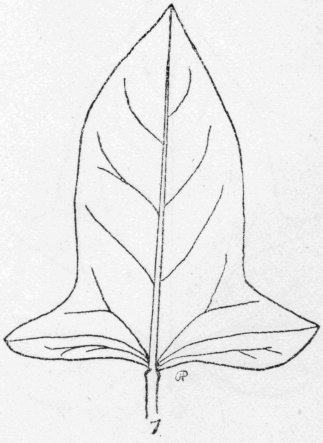
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SHOULDERED VARIETIES.

GOLD SKIN.—Foliage pale green, obtuse; vines root slightly, length five feet; tubers oblong, medium size, dull yellow, grow in a beautiful bunch near the surface. Rather weak and does not stand drouth well. See page 339, fig. 25.

DELAWARE.—Foliage pale green, obtuse; vines root profusely; tubers oblong, medium size, dull yellow. Practically the same as Gold Skin. See page 339, fig. 25.

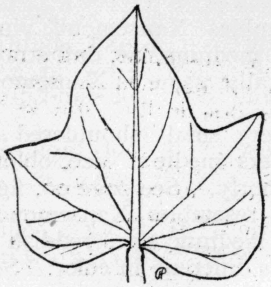
EXTRA EARLY CAROLINE.—Foliage pale green, obtuse conical; vines root slightly; tubers oblong, rather small, dull yellow; grow in a bunch like Gold Skin. See page 339, fig. 12.

EARLY GOLDEN.—Foliage pale green, deeply lobed; vines root slightly, length seven feet; tubers conical, medium size, dull white. Appears to have originated in Virginia as "a sport of the Early Red." See page 339, fig. 20.

YELLOW JERSEY.—Foliage pale green, obtuse conical; vines root slightly, length six feet; tubers oblong, medium size, dull yellow; grow in a cluster near top of ground like Extra Early Caroline. See page 339, fig. 15.

BRAZILIAN.—Foliage purple when young, when older light green, sagitate; vines purple at tips, vigorous, root slightly, length twelve feet; tubers long, medium size and fair quality, light purple; grow wide apart and deep down into the soil. See page 339, fig. 7.

RED BERMUDA.—Foliage pale green, variable in shape but practically same as Brazilian; vines vigorous, root slightly, length ten feet; tubers spindle shaped, small, deep purple, rough and uneven; grow widely apart. Poorer quality than Brazilian. See page 339, figure 7.



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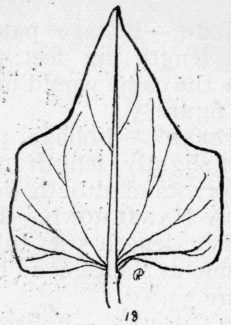

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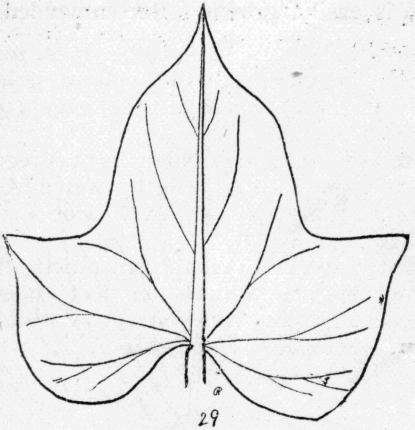

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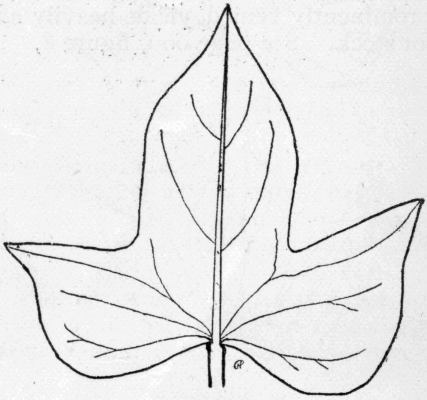

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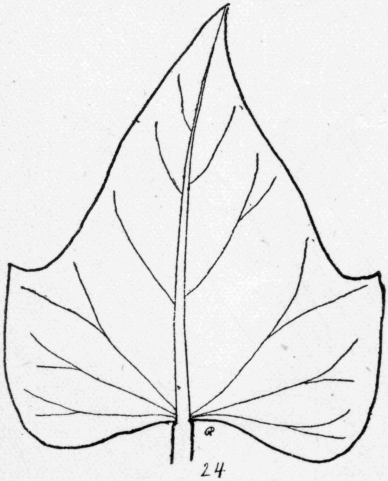

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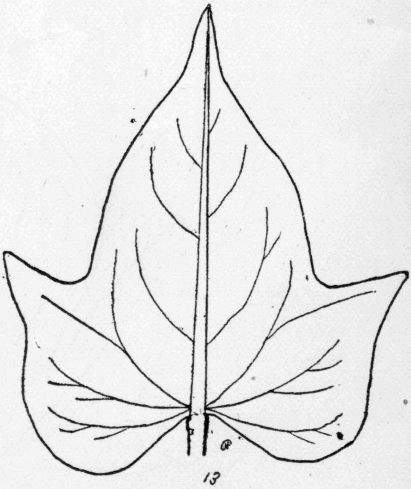

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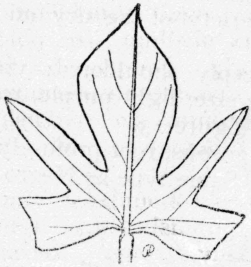
RED NOSE.—Foliage pale green, resembles Nausemond; vines root profusely, length six feet; tubers oblong, medium size, dull straw color; not red as the name would indicate; practically same as Nansemond. See page 00, figure 5.

NEW JERSEY.—Foliage pale green, very small shouldered slightly, vines root slightly; length nine feet; tubers medium size, oblong, dull straw color; stands drouth well but yield poorly. See page 00, figure 18.

YELLOW NANSEMOND.—Foliage green, resembles Nansemond; vines root slightly, length 5 ft; tubers oblong, medium size, reddish brown foliage same as Nancemond but the tuber is different in color. See page 000, figure 33.

NEGRO CHOKER.—Foliage pale green, deeply shouldered; vines vigorous, root considerably, length 9 feet; tubers roundish, large, light purple, prominently veined, yields heavily and is easily grown. Recommended for stock. See page 000, figure 8,



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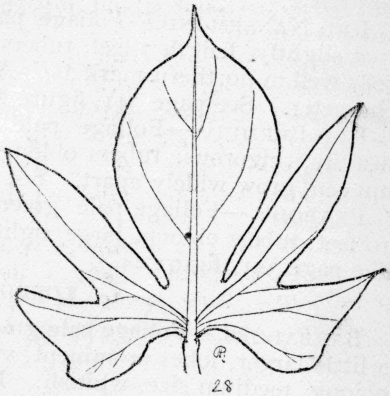

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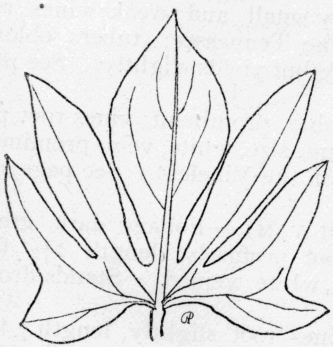

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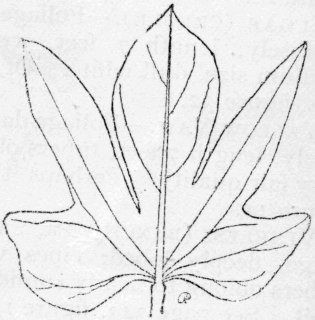

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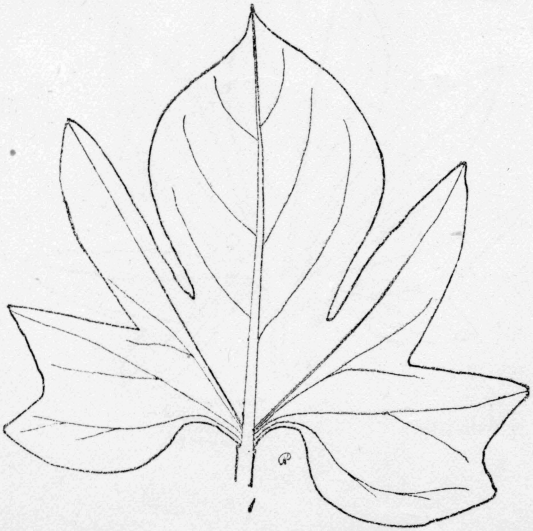

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RED NANSEMOND.—Foliage pale green, deeply lobed, obtuse; vines root slightly, length 7 feet; tubers oblong, medium size, color dull red; sells well in northern markets. A good variety of the dry and mealy character. See page 341, figure 29.

RED BERMUDA—Foliage pale green, deeply shouldered; vines root heavily, vigorous; tubers oblong, medinm size, light purple, rough and uneven, grow widely apart. See page 341, figure 13.

PEABODY.—Foliage pale green; vines vigorous, root profusely, length 10 feet; tubers oblong, large, light purple. Same type as Negro Choker. See page 341, figure 24.

LOBED VARIETIES.

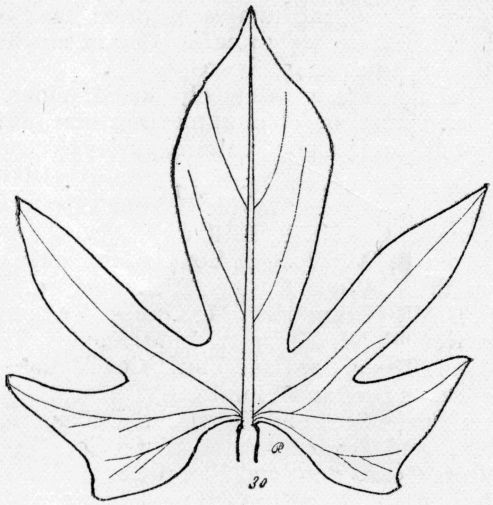
BARBADOES.—Foliage pale green, practically same as Tennessee except a little larger, lobes prominent; vines root slightly, length 7 feet; tubers oblong, medium size, whitish. Does not yield heavily. See page 343, figure 28.

SUGAR (CREOLE).—Foliage green, very small and weak; vines root profusely, length 7 feet, very weak like Tennessee; tubers oblong, medium size, dull white. Of good quality but yields slightly. See page 343, figure 32.

YELLOW YAM.—Foliage dark green, lobes prominent; vines root profusely, length 7 feet, tubers oblong, medium size, white, veins prominent, very fair quality. Perhaps the parent of the Vineless. See page 343, figure 11.

VINELESS (BUNCH YAM, EARLY BUNCH YAM).—Foliage dark green, large, deeply lobed; vines vigorous, root profusely, length 2½ feet, tubers oblong to nearly round, good size, white, veined. Stands drouth well. See page 343, figure 1.

SPANISH YAM.—Foliage pale green, vines root slightly, length 7 feet; tubers oblong, medium size, dull white. Injured by drouth. See page 343, figure 17.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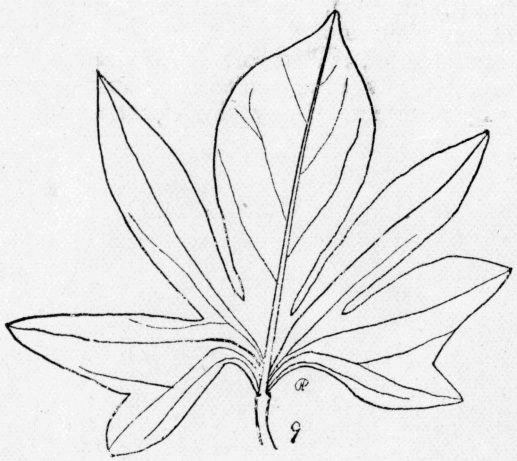
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GEORGIA.—Foliage pale green, lobes wide apart, vines rooted slightly, length, 8 feet; tubers oblong, medium size, white; has good table quality but was injured much here by drouth. Grown much in Georgia and other States south. See page 245, figure 30.

TENNESSEE.—Foliage green, decidedly lobed; vines root slightly, length 6 feet; tubers round to oblong, medium size, dull white. Has high table quality but requires good culture. See page 145, figure 9.

SOURCE OF SEED.

Bunch Yams from C. C. L. Dill, Dillburgh, Ala.
Nansenmond, from T. W. Wood & Sons, Richmond, Va.
Red Nose, from T. W. Wood & Sons, Richmond Va.
Brazilian, from E. W. Kirkpatrick, McKinney, Texas.
Negro Choker, from E. W. Kirkpatrick, McKinney, Texas.
Early Bunch Yam, Texas Seed and Floral Co., Dallas.
Vineless, from Texas Seed and Floral Co., Dallas.
Tennessee, frem Texas Seed and Floral Co. Dallas.
Southern Queen, from Texas Seed and Floral Co., Dallas.
Yellow Yam, from Texas Seed and Floral Co., Dallas.
Extra Early Caroline, F. Barteldes & Co., Lawrence, Cansas.
Red Bermuda, F. Barteldes & Co., Lawerence, Kansas.
Black Spanish, F. Barteldes & Co., Lawrence Kansas.
Early Golden, F. Barteldes & Co., Lawrence, Kansas.

The following varteties were kindly given us by Prof. F. H. Burnett, of the Louisiana Agricultural Experiment Station, Baton Rouge, La:

Spanish Yam, New Jersey, Dog River, Early Golden, Hayman, Big Stem Jersey, Bermuda, Peabody, Gold Skin, Delaware, Norton, Barbadoes, Shanghai (California), Red Bermuda, Georgia, Pumpkin, Sugar (Creole), and Yellow Nansemond.

This Bulletin is intended as a report ot progress and will be followed by another on methods of keeping, cultivating and propagating, also the increase of the sugar content, if any, during storage and the application of fertilizers.